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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/727,062

12/02/2003

John G. DeSteele

23-69853-01

4870

32215 7590 07/20/2009
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EXAMINER

BARTON, JEFFREY THOMAS

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

07/20/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/727,062	Applicant(s) DESTEESE ET AL.	
	Examiner Jeffrey T. Barton	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-7 and 32-52 is/are pending in the application.
- 4a) Of the above claim(s) 39-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-7,32-38,51 and 52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20090203, 20090326, 20090507</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 7 May 2009 does not place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 31 December 2008

2. All rejections are maintained.

Election/Restrictions

3. Claims 39-50 stand withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 24 March 2008.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 5-7, 32-34, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Migowski (WO 89/07836; citations below are to the English translation provided on the IDS of 13 November 2007) in view of Bass et al. (US 6,207,887)

Regarding claims 1, 51, and 52, Migowski discloses a method for providing power, comprising: providing a thermoelectric generator having a first end and a second end (Figures 2 and 4); exposing the first and second ends to two different temperature regions (Paragraph bridging pages 2 and 3, Paragraph bridging pages 4 and 5); utilizing a difference between the temperature regions to produce electric power; wherein the thermoelectric generator comprises a plurality of thermocouples comprising p-type and n-type thin film semiconductor thermoelements formed on a single flexible

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substrate. (Paragraph bridging pages 2 and 3 through the third full paragraph of page 3)
Migowski discloses sputter deposition of the thermoelements. (1st full paragraph on page 3)

Regarding claims 5-7, Migowski teaches forming the p- and n-type thermocouples from Bi, Te, Sb, Se, or Pb. (3rd full paragraph of page 3) As bismuth telluride and other claimed compounds are conventional thermoelectric materials, selection of these known materials based on this listing would have been obvious to one having ordinary skill in the art.

Regarding claims 32 and 33, Migowski teaches preparing the generator on a single continuous flexible substrate and winding the substrate in a coil. (Paragraph bridging pages 2 and 3 and the 1st full paragraph of page 3)

Migowski does not explicitly disclose a device with pluralities of thermoelements connected in series and parallel precisely as claimed.

Bass et al disclose a series-parallel connection scheme for a thermoelectric generator (Figure 13A; Column 6, lines 46-62) in which plural n-type elements are connected electrically in parallel and are connected in series to a plurality of p-type elements that are connected to each other in parallel. Four thermoelements are present in each resulting couple.

It would have been obvious to one having ordinary skill in the art to modify the method of Migowski by employing the series-parallel connection scheme of Bass et al, because Bass et al teach that such connection protects against complete power loss in

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the event of damage to a single thermoelement, thus providing increased reliability.

(Column 6, lines 46-62)

Regarding the limitation to power being generated "regardless of whether the first temperature region is warmer or cooler than the second temperature region", the Examiner's position is that any thermopile having hot and cold junctions will provide power regardless of which junction side has the higher temperature. Reversing the hot and cold sides results in reversal of the polarity of the output power, but power is generated in either case.

Regarding the limitation to a range of specific L/A ratios, selection of element dimensions is considered to be a matter of design choice, depending upon the dimensions and gradient present in the installation site, substrate dimensions, desired number of junctions, desired voltage, among other considerations. In the absence of evidence of criticality, selection of length to area ratios as claimed is considered obvious to one having ordinary skill in the art. Also note that in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Regarding claim 33, as a spindle is a conventional means of aiding in coiling an elongated material, it would have been obvious to one having ordinary skill in the art to provide the coiled generator of Migowski by winding it around a spindle, with the

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predictable result of production of the desired coiled generator. As a skilled artisan would have recognized that the semiconductor materials of the device are not ideally flexible, such a spindle would have also provided the expected advantage of preventing coiling the device with too small a diameter, thus preventing damage to the device.

8. Claims 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Migowski and Bass et al as applied to claims 1, 5-7, and 31-34 above, and further in view of Simeray et al. (US 6,340,787)

Migowski in view of Bass et al is relied upon for the reasons given above.

Migowski et al suggest use of their thermoelectric generator for general "power supply units, etc." (Page 3, 6th full paragraph)

Neither Migowski nor Bass et al explicitly teaches the particular first and second temperature regions instantly claimed.

Simeray et al teach low-power thermoelectric generation using small temperature gradients, as used by Migowski et al, specifically teaching that the first and second temperature regions can be the ground and the air above the ground (Figure 6; Column 6, lines 17-30) or air inside a building and air outside a building. (Figure 5, Column 6, lines 10-16)

Relevant to claim 36, in the ground/air embodiment, Simeray et al disclose a heat pipe (74) connected to the first end and buried in the ground. (Figure 6) Relevant to claim 37, Simeray et al disclose a second heat pipe (73) coupled to the second end.

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Such a "heat exchanger" and "thermal collection stake" read on the instant heat pipes, as they conduct heat to the respective hot and cold junctions.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Migowski by employing the generators in locations such as between the ground and air, or in a wall of a building, as taught by Simeray, because Simeray teaches that such locations provide suitable temperature gradients for low power thermoelectric generators and Migowski suggests that his generators may be used generally in power supply units. Such a combination will provide the predictable result of successfully generating power.

Specific to claim 38, building interiors conventionally have HVAC systems having ducts. Therefore, the interior of the building comprises air inside ducts, while the exterior of the building comprises air outside of such ducts. The combination thus meets the limitations of the claim.

Declaration under 37 C.F.R. §1.132

9. The declaration of John DeSteele filed on 7 May 2009 has been fully considered, but is not persuasive because it fails to persuasively demonstrate criticality of the claimed range of L/A ratio. There is no evidence that whatever difference in performance exists between Applicant's exemplary devices and the example of Migowski is the result of the L/A ratio, as opposed to numerous other variables, such as the number of thermocouples provided in the devices or the composition of the thermoelements, for example, or that any such difference would have been unexpected

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to one having ordinary skill in the art. Furthermore, Application 10/726,744 (Incorporated by reference and source of most of the instant disclosure of L/A ratio limitations; See instant specification at Page 8, lines 7-10) indicates that L/A ratios greater than $10,000 \text{ cm}^{-1}$ are contemplated for the instant devices. (e.g. Application 10/726,744 Specification Page 6, lines 20-26; Page 8, lines 3-7; Page 9, lines 15-20; and Page 10, lines 24-28) Such disclosure within the document relied upon for support of the instant ratios argues strongly against the criticality of the instantly claimed upper limit of $10,000 \text{ cm}^{-1}$ for the range of L/A ratios.

Response to Arguments

10. Applicant's arguments filed 16 October 2008 have been fully considered but they are not persuasive.

Applicant's arguments that none of the prior art of record teaches or fairly suggests the instant length to area ratio are well taken, but no evidence of criticality of the claimed dimensions has been provided, and the rejection is therefore maintained. Applicant's assertions of the importance of the dimensions cannot take the place of evidence on the record. Note *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Applicant is invited to provide evidence of criticality of the dimensions. As noted above, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative

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dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. As pointed out in addressing the declaration of John DeSteele above, there is as of yet no persuasive evidence of record that any significant difference in performance would result simply from the selection of the claimed dimensions.

Applicant argues that the prior art does not recognize the L/A ratios as result-effective variables. In response, the Examiner points out that the rejection is not based on optimization of the L/A ratio, and therefore, whether or not the L/A ratio was recognized as result-effective is immaterial. Applicant has failed to meet the burden of demonstrating that the claimed L/A ratio is critical.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey T. Barton whose telephone number is (571)272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey T. Barton/
Examiner, Art Unit 1795
14 July 2009